WHAT IS CLAIMED IS:

1. A surface plasmon resonance sensor comprising:
a prism having a surface on which a metallic layer is coated;
a metallic nanoparticle layer formed on the metallic layer;
a light source giving off a light to the prism, the light being reflected by the surface of the prism to form a reflected light; and
a light detector for detecting the reflected light.

2. The surface plasmon resonance sensor according to claim **1** further comprising a dielectric layer coated on the metallic nanoparticle layer.

3. The surface plasmon resonance sensor according to claim **1**, wherein the light source comprises a semiconductor laser array for radiating multiple laser beams, a polarizing device and a half-wave plate for adjusting polarized components of the laser beams.

4. The surface plasmon resonance sensor according to claim **1** further comprising a spectral prism for splitting the reflected light into polarized transverse magnetic light wave and transverse electric light wave.

5. The surface plasmon resonance sensor according to claim **1**, wherein the metallic layer comprises gold.

6. The surface plasmon resonance sensor according to claim **1**, wherein the metallic layer comprises silver.

7. The surface plasmon resonance sensor according to claim **1**, wherein the metallic layer has a thickness of approximately 50 nm.

8. The surface plasmon resonance sensor according to claim **1**, wherein the metallic nanoparticle layer comprises at least nanometer order grains selected from a group consisting of gold, silver and platinum.

9. The surface plasmon resonance sensor according to claim **1**, wherein the metallic nanoparticle layer comprises nanoparticle having a diameter of approximately 1-50 nm.

10. The surface plasmon resonance sensor according to claim **1**, wherein the metallic nanoparticle layer has a thickness of approximately 1-50 nm.

11. The surface plasmon resonance sensor according to claim **1**, wherein the metallic nanoparticle layer is formed by means of co-sputtering.

12. The surface plasmon resonance sensor according to claim **8**, wherein the metallic nanoparticle layer comprises a material selected form a group consisting of polymethyl methacrylate (PMMA) and silicon oxide.

13. The surface plasmon resonance sensor according to claim **1** further comprising a self assembled monolayer adjacent the metallic nanoparticle layer.

14. The surface plasmon resonance sensor according to claim **13**, wherein the self-assembled monolayer comprises at least one of functional groups and molecule selected from a group consisting of SH, NH_2, CHO, COOH, and Biotin.

15. A method for detecting properties of substance by using a surface plasmon resonance sensor, the method comprising the following steps:
    (a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source giving off a light to the prism, the light being reflected by the surface of the prism to form a reflected light and a light detector for detecting the reflected light;
    (b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;
    (c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and
    (d) contacting said substance with the sensing layer.

16. A method for detecting properties of substance by using the surface plasmon resonance sensor, the method comprising the following steps:
    (a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source comprising a semiconductor

laser array for radiating multiple laser beams, a polarizing device and a half-wave plate for adjusting polarized components of the laser beams, and light detector for detecting a reflected light formed by reflecting the laser beams by the surface of the prism;

(b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;

(c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and

(d) contacting said substance with the sensing layer.

17. A method for detecting properties of substance by using the surface plasmon resonance sensor, the method comprising the following steps:

(a) preparing a surface plasmon resonance sensor comprising a prism having a surface on which a metallic layer is coated, a metallic nanoparticle layer formed on the metallic layer, a light source giving off a light to the prism, the light being reflected by the surface of the prism to form a reflected light, a spectral prism for splitting the reflected light into polarized transverse magnetic light and transverse electric light wave and a light detector for detecting the polarized waves;

(b) preparing a self-assembled monolayer on surface of the metallic nanoparticle layer of the surface plasmon resonance sensor;

(c) preparing a sensing layer immobilized onto the self assembled monolayer for reacting with said; and

(d) contacting said substance with the sensing layer.